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Crystal Symmetry and Polarization of High-order Harmonics in ZnO C. D. LIN, Kansas State University, SHICHENG JIANG, Nanjing University of Science and Technology, SHIMA GHOLAM-MIRZAEI, E. CRITES, J. BEETAR, University of Central Florida, T. LU, Nanjing University of Science and Technology, M. CHINI, University of Central Florida — We carried out a joint theoretical and experimental study on the orientation dependent parallel and perpendicular HHG from the a-cut of ZnO. It was found that the dependence of parallel and perpendicular polarizations on the crystal orientation for all odd harmonics are nearly identical, but they are quite different from even harmonics which also show little order dependence. Two general features are: 1)parallel even harmonics and perpendicular odd harmonics vanish when the laser polarization is perpendicular to the mirror plane; 2) perpendicular even and odd harmonics vanish when the laser polarization is parallel to the mirror plane. These general behaviors have also observed in other prior experiments. Our theoretical model shows that a 1D two-band model is adequate for describing harmonics from ZnO if the phase of the transition dipole is correctly treated. We conclude that polarization properties of HHG from solids are mostly governed by symmetry properties of the target and not dependent on the excitation mechanisms such as Berry curvature, band curvature or interband excitation.

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